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GEOGRAPHY AND ARCHÆOLOGY OF PERU.* — While in England recently, Mr. Squier was induced by his friends to reprint in pamphlet form the paper which he read before the American Geographical Society in February last. We gave an abstract of that portion of the lecture which related to the Archæology of Peru in the NATURALIST for September; but the present pamphlet contains much interesting and important information relating to the geography of the great Titicaca basin to which we did not allude in our former notice, and will well repay reading by all interested in this great centre of a prehistoric nation.

NATURAL HISTORY MISCELLANY.

ZOOLOGY.

MORPHOLOGY AND ANCESTRY OF THE KING CRABS. — In a communication to the Boston Society of Natural History, Oct. 17, 1870, Dr. A. S. Packard, Jr. stated that a study of the embryology of Limulus, as well as its anatomy, led him to consider, as several authors had done, from Savigny and Van der Hoeven down to the present time, the anterior division of the body as a cephalothorax, the posterior division being the abdomen. Latreille, Milne-Edwards, and more recently Mr. Henry Woodward,† the distinguished palæontologist, have regarded the anterior division of the body as the head, and the posterior division as embracing the thorax and abdomen, the last three segments in Mr. Woodward's opinion, including the telson, representing the abdomen. Against this view he thought could be brought the embryological facts already stated at the meeting of the American Association for the Advancement of Science at Troy. He there stated that the germ first started as a Nauplius and that just previous to moulting a Nauplius-skin in the egg, the abdomen was differentiated from the cephalothorax. In this latter region (composed of six segments) are contained not only the eyes, simple and compound, but all the ambulatory appendages, which surround the mouth and are true maxillipeds, no antennæ or thoracic appendages being developed. This region contains the stomach and a considerable portion of the intestine, and the liver, which opens into the intestine near the middle of the cephalothorax, sending but a single pair of biliary tubes into the abdomen. The anterior half of the dorsal vessel, with two pairs of arteries and two pairs of valvular openings, is situated in the cephalothorax.

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* Observations on the Geography and Archæology of Peru. By E. G. Squier, M.A., F.S.A. etc. 8vo. pamph. London. Trubner & Co., 1870. (Price 25 cents. Address Naturalists, Agency.)

† On some Points in the Structure of the Xiphosura. Quarterly Journal of the Geological Society of London for Feb. 1867.

Lastly, the genital openings in both sexes are situated on the first pair of abdominal lamellate appendages, the testes and ovaries lying wholly in the cephalothorax; the ovaries, when distended with eggs, filling up the front of the cephalothoracic shield.

The abdomen consists of nine segments, the long spine-like telson forming the ninth, as seen plainly in the embryo. The abdominal cavity is small, the abdomen being very thin, and mainly filled with the muscles attached to the lamellate feet.

There are, then, in Limulus, no thoracic feet, comparable with those of the Decapods and the Tetradecapods, and the thoracic region (as much of it as exists), is merged with the head, in fact never becoming differentiated from the head proper. Thus we have in Limulus a crustacean with the body divided into two regions; a cephalothorax (the thorax being potential, viewed externally, with no appendages or segments to indicate its existence) and a nine-jointed abdomen.

This disposition of the body-segments is paralleled by the zoëa, or young, of the Decapods. In the freshly hatched zoëa the body is divided into two regions; the cephalothorax, with no trace at first of thoracic segments, or thoracic appendages, (the two pairs of large feet being deciduous maxillipeds), the thorax not being yet differentiated; and a five-to-seven-jointed abdomen. The size of the cephalothorax, as compared with the abdomen, varies greatly in the different forms of zoëæ, some zoëæ strongly resembling Eurypterus in the small cephalothorax. After the first moult five pairs of rudimentary thoracic limbs arise at the hinder portion of the cephalothorax, thus proving our statement that the cephalothorax of Limulus, and consequently the so-called "head" of Eurypterus and Pterygotus, combines a head with a potential thorax, the latter never becoming differentiated in subsequent moults.

In the Trilobites, however, according to the late discovery of Mr. Billings, the thoracic segments bearing jointed feet are developed; though, as shown by Barrande, the larval trilobite is hatched either without any, or with but a single, thoracic segment. Limulus, Eurypterus, Pterygotus, and their allies (Huxley has aptly compared the Eurypteridea to a zoëa), with the Phyllopods, may be considered as virtually zoëæ, or to be more precise, (since they lack many important characters of zoëæ), retarded or retrograde zoëæ.

Speculating on the ancestry of the members of the subclass * of Branchiopoda, he would trace them all to a common Nauplius form, as Haeckel, Fritz Müller, and Dohrn had done. This Nauplius form may have existed in the Laurentian Period, as we already find highly organized Trilobites, Phyllopods, and Ostracodes in the lowest Silurian strata. He

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* Though in his communication to the American Association he has spoken of the Branchiopoda as an *order*, of which he regarded the Pœciloptera as a suborder, he thought the term *subclass* preferable, as, with the subclasses Decapoda and Tetradecapoda, etc., they were much more general groups than the orders of Vertebrates as first limited by Linnæus, whose idea of an order we should follow for the sake of uniformity, just as the term *family* should be applied in the sense in which Latreille used it.

suggested that the modern Phyllopods, such as Apus and Branchipus, may have descended perhaps, by two parallel lines of descent from certain Silurian Copepoda and Ostracoda. He accounted for the origin of these forms rather by a process of acceleration and retardation of development as suggested by Messrs. Cope* and Hyatt,† involving a more or less sudden formation of generic forms, than by the theory of Natural Selection, which involves an indefinite number of slight modifications for the production of even a variety, and such a succession of intermediate generic forms as we do not find recent or fossil. He also thought that the study of the facts of Dimorphism and Parthenogenesis, and the mode of production of the more remarkable sexual differences among animals, would throw light on a comprehensive theory of evolution.

THE ANCESTRY OF INSECTS. — Referring to his discovery of Pauropus in this country, and mentioning the six-legged form of the young, and its resemblance to Podura, and comparing it with the Hexapodous young of Julus and the young of certain mites, Dr. Packard, at the same meeting, referred the ancestry of the Myriapods, Arachnids, and Hexapodous Insects to a Leptus-like terrestrial animal, bearing a vague resemblance to the Nauplius form among Crustacea, inasmuch as the body is not differentiated into a head, thorax or abdomen, and there are three pairs of temporary appendages. Like Nauplius, which was first supposed to be an adult Entomostracan, the larval form of Trombidium, had been described as a genus of mites under the name of Leptus (also Ocypete and Astoma) and was supposed to be adult.

For this primitive, ancestral form he proposed the term Leptus. He suggested that the ancient Leptus may have descended through Demodex from some Tardigrades, and that this latter group had perhaps descended through some form like Linguatula, from a true terrestial worm, like the remarkable Peripatus, for example. The Myriapods may, through a parallel line of descent, have been evolved from some Leptiform animal like the young of Pauropus, while the Hexapoda may have descended by a parallel line of descent through some Leptiform Silurian insect resembling the young of Stylops, Meloe, and low neuropterous or orthopterous larvæ, and the Thysanura, such as Podura and Lipura. He did not regard the insects as having been evolved either from a zoëa or Nauplius form, but would refer the ancestry of both classes (the Insects and Crustacea), independently of each other, to the worms (Annulata).

MONTEREY IN THE DRY SEASON. — On returning to the coast from the Colorado valley in May, 1861, my health impaired by the tropical heat of the last two months at Fort Mojave, and by the too sudden change to the foggy climate of the coast, I was glad of the opportunity of recruiting it by some weeks devoted to collecting marine animals, etc., at Monterey.

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* Origin of Genera. Philadelphia. 1868.

† Parallelism between the order and individual in the Tetrabranchiate Cephalopods. Memoirs of the Boston Society of Natural History, 1866, and AMERICAN NATURALIST, Vol. 4, pp. 230 and 419.

Leaving, therefore, my military companions at San Diego, I travelled to San Francisco by land, picking up about forty species of Mollusca at points along the southern coast.

My preparations for dredging, determining my collections, and describing the new vertebrates detained me in San Francisco until August 9th, when I went to Monterey by steamer. There I remained until September 26th, dredging, and collecting along shore chiefly Mollusca, but not neglecting other animals. The additional species collected were thirty-two of Vertebrata, one hundred and seventy-five Mollusca (thirty new species) twenty-seven Radiata and twenty-six Articulata (marine, as I kept no account of the land species constantly preserved). As I have written a very full report of the Mollusca collected, for the American Journal of Conchology, and as most of the other invertebrates have never been determined, because they were lost in the ill-fated steamer "Golden Gate," together with a large collection from the southward, made previous to June, 1862, I can give little that is new or interesting relating to my Monterey collections. The season was the worst for collecting birds, they being in moult; mammals were difficult to obtain and the fishes were chiefly those common in the San Francisco market. Though many whales were killed during my visit, chiefly the "California Gray" (*Rachianectes glaucus* Cope), it was impossible to obtain measurements and drawings of them as they were always cut up while floating, and the mutilated carcasses when washed ashore were deprived of "flukes" and other essential parts, besides smelling so strong that the odor for miles was almost unbearable.

The land mammalia were chiefly very distinct from those of Fort Mojave, as is naturally to be expected in comparing a well-wooded, fertile region with an almost barren desert. The Grizzly Bear was quite common, though I saw only its tracks. Several others of the large forest quadrupeds, well known as Californian, are doubtless to be obtained by longer and more thorough search than I could make. I got two small rodents, the representatives of species to be found at Fort Mojave, viz: the California Wood-rat (*Neotoma fuscipes*), and Wood-mouse (*Hesperomys Californicus*), also one of a genus not found there, the Monterey Field-mouse (*Arvicola edax*).

The most characteristic land birds were the Vulture (*Cathartes Californianus*), the Pigmy Nuthatch (*Sitta pigmæa*), western variety of the Yellow-bellied Fly-catcher (*Empidonax flaviventris* var. *difficilis*), Least Titmouse (*Psaltriparus minimus*), Yellow-billed Magpie (*Pica Nuttallii*), Western Crow (*Corvus caurinus*), White-tailed Hawk (*Elanus leucurus*) besides many representatives of species found in the Colorado valley, such as the Quail (*L. Californicus*), Bowbill Thrush (*H. redivivus*), Anna Humming-bird (*Althis Anna*), Heermann's Song Sparrow (*M. Heermanni*), Californian and Brown Finches (*Pipilo megalonyx* and *fuscus*), while a few seen there only in winter or spring were here breeding, viz: the Black Pewee (*Sayornis nigricans*) Dwarf Thrush (*Turdus nanus*), Western Bluebird (*Sialia Mexicana*), Barn and Cliff Swallows (*Hirundo horreorum* and *lunifrons*), Bewick's Wren (*Thriothorus Bewickii*), Parkmann's Wren (*Troglodytes Parkmanni*), Oregon Snow-bird (*Junco Oregonus*), Chippy (*Spizella socialis*), while a longer residence would no doubt largely increase all these lists. I must however remark that all these, except the second, fifth, and twenty-first, are also summer residents as far south as San Diego, and the three exceptions are probably so in the high mountains east of there. This shows the remarkable uniformity of the fauna, corresponding to that of climate, in zones running parallel to this coast for distances of over five hundred miles.

Of water-birds I observed a few of interest. The whale fishery attracted several species usually seen only far off shore, of which the enormous Petrel or "Gong" (*Ossifraga gigantea*), could often be seen swimming lazily near the try-works to pick up scraps of blubber, sometimes accompanied by the dusky young of the Short-tailed Albatross (*Diomedea brachyura*). The Pacific Fulmars (*F. pacificus*), called by the whalers "Tager" or "Haglet," were common off shore, feeding also on whale meat, but oftener observed chasing the Gulls to make them disgorge. The Murres (*Lomvia Californica*), and Sea Doves (*Brachyzaurphus marmoratus?*), in the open bay seemed strange at this season, but probably both breed near by. On Sept. 10th, I observed many young Phalaropas (*P. hyperboreus?*) about the brackish lagoons near the beach, and a few of the Wandering Tatler (*Heteroseclus brevipes*), as usual among rocks along shore. On the 12th, saw small Grebes (*Podiceps Californicus*), probably lately come from their breeding station; and by the 18th, families of about five each, became common. On the 25th, I first noticed the large Grebe (*P. occidentalis*), but as I left next day I saw no more of the arrival of winter visitors. I need not here particularize the common Sandpipers, Gulls, Terns, Plovers, etc., as I did not preserve any of them, and will have more to say about them when describing my winter collections made at San Diego.

Reptiles are not common at Monterey, on account of the coolness of the summer climate, fogs obscuring the sun for at least half the summer. I found but two species, the large Ridge-back Lizard (*Gerrhonotus multicarinatus*), and a *Plestiodon*, both common in woods from here northward. Batrachia however are well suited by the damp climate, as besides Frogs (*Rana* sp. and *Hyla regilla*), and Toads (*Bufo halophila?*), I found a Salamander (*Batrachoseps attenuatus*) even at this extreme of the dry season, not uncommon.

I will not specify the thirty species of fishes obtained, as most of them have no peculiar English names and the list would be of little interest to general readers. — J. G. COOPER.

THE ROUGH-BILLED PELICAN ON LAKE HURON. — On the evening of the 15th of June, 1870, a most remarkable specimen of the rough-billed pelican (*Pelecanus erythrorhynchus* Gmelin) was shot by Captain Oliver Maisonville in the marsh at Sarnia, Lambton County, Ontario (Canada).

This bird is very rare on the great lakes, and the individual in question, which was of the male sex, was of unusually large size. It weighed thirty-three pounds, and the expanded wings measured in full one hundred and eight inches! The bill from the eye was sixteen inches in length, being of a dirty yellow or yellowish brown. The plumage was almost pure white, with the exception of the alula, primary coverts, and primaries, which were black, as usual. The long feathers on the breast and those of the crest were of a very pale yellow tint. I also noticed, what I have seen no mention of in the description of this species, that over each eye was a group of small feathers of a brownish black color, and of more than an inch in length, almost simulating an eyebrow; a few feathers of a similar or lighter hue being scattered towards the back of the head. The plumage exhibited nothing of the roseate tinge which this species is described as having at the season of reproduction.

In Baird, Cassin, and Lawrence's "Birds of North America," this pelican is mentioned as breeding "in the fur countries, generally selecting inaccessible places in the neighborhood of water falls;" and as being found "throughout the United States, rare on the coasts of the Northern and Middle States;" and as also inhabiting "throughout the Rocky Mountains and California." The same work gives the stretch of wings as seventy inches, and length of bill 13.50, while much smaller specimens are recorded. Mr. James Hobson, who mounted our specimen, and who is of much experience in this direction, having received several of this species from Florida and elsewhere, says he never before saw so large a pelican; all others he had seen being insignificant in comparison. During a residence of over twenty years in the region of the great lakes, I had not previously met with the pelican, nor had I heard of more than three instances of its having been captured within their limits.

The marsh at Sarnia is an inlet or overflow of the river St. Clair, near its head, and about one mile from the south shore of Lake Huron. The pelican was feeding in the marsh, and had been there two days, having arrived on the evening of the 13th of June. When first seen it was flying from the northward, from the direction of the lake. On the morning of the 14th it flew back to Lake Huron, but returned in the evening of the same day, remaining till shot on the following evening, as before stated. It was very active, wandering over the marsh all day, swimming about, or only rising for a short flight, and alighting again in the water. Strange to say there were no fish found in its pouch; only a few small worms and insects. — HENRY GILLMAN, *Detroit, Michigan.*

MIGRATION OF HAWKS. — Do hawks migrate in pairs only, or do they migrate in flocks and separate into pairs as they arrive at their breeding places? In 1856 my attention was called to quite a number of hawks that were diving, and screaming, and going through various gyrations high in the air (as they commonly do in the spring when pairing) and passing to the north-east. Not making any note of the occurrence I cannot give the exact number or date. It was early in the spring, and there must have been twenty or more. Early in April, 1860, I witnessed a similar migration when the number in sight at one time was about fifty. A friend of mine in an adjoining town, who is a very careful and accurate observer, asked me a short time since if I ever saw a flock of hawks? He said that early this spring (1870), about the last of March or the first of April when passing over his farm with his two sons, his attention was attracted by the screaming of hawks, and on looking up the air seemed to be filled with them. They attempted to count them, but found it somewhat difficult to be perfectly accurate, as the birds were constantly in motion, diving and screaming and passing northward, yet they counted seventy-three in sight at one time. In both of the flights which I witnessed, and also in that seen by Mr. S. and his sons, the hawks were not in flocks according to the common acceptation of the word flock, but were in pairs, or groups of about four usually, all passing in the same direction, northward. Having never read in our works on natural history, of such numbers passing at one time, I give these facts, hoping to call the attention of our ornithologists to them, and draw out from them any observations which they have made on the subject. — WM. WOOD, M.D., *East Windsor Hill, Connecticut.*

SCUDDER'S WORK ON NEW ENGLAND BUTTERFLIES. — Illness in my family has thus far prevented my completing the work on New England Butterflies announced some time since in these columns. This delay has, however, enabled me to extend the original plan of the book much more fully than was anticipated.

I gladly take this opportunity of thanking my many friends and correspondents for the cordiality with which they have seconded my undertaking, in furnishing me with innumerable notes upon the times of appearance and prevalence of different butterflies in their respective localities. When it is known that such memoranda have already been received from ninety different persons, covering a period of observation of from one to ten years, and, in the case of some butterflies, including as many as one hundred and fifty or two hundred notes for a single species, it is not too much to say that we shall arrive at a degree of exactitude upon the history, seasons, and geographical distribution of our butterflies, which we have not hitherto enjoyed.

In the hope of gaining still further knowledge on these points, I should be pleased to receive notes made by any observers during the season of 1870; descriptions of habits, modes of flight and of posture would be most welcome; and since the result of inquiries has proved the necessity of incorporating in a work on the butterflies of New England and vicinity many forms not mentioned in previous lists of New England species, I beg all persons interested to send me the fullest possible notes, as well as examples of the early stages of the following species (most of these have seldom or never been known to occur in New England; where the names are italicized, specimens of the imago are desired for examination): Papilio Marcellus, *Pieris Virginiensis*, *P. vernalis*, Callidryas Eubule,

Colias Labradorensis, *C. Keewaydin*, C. Eurytheme, Terias Lisa, Xanthidium Nicippe, Anthocaris Genutia, *Nymphidium dorsale*, Lycæna violacea, L. Pembina, L. Scudderii, *Thecla Ontario*, *T. Clothilde*, *Euptoieta Claudia*, *Melitœa Batesii*, *Apatura Clyton*, *Grapta Dryas*, G. Fabricii, G. interrogationis, *Libythea Bachmanii*, *Satyrus areolatus*, Chionobas Jutta, Nisoniades Lucilius, *N. Horatius*, *N. Virgilius*, N. Martialis, N. Icelus, *Eudamus Bathyllus* (not Pylades) *E. Olynthus*, Hesperia Oileus, H. Wingina, H. vialis, H. Monoco, H. Hianna, *H. Mesapano*, H. Delaware, H. Phylæus, *H. Wyandot*, and *H. Huron.*

Persons possessing from their collections and memoranda any precise data, however meagre, for determining the respective times of appearance of the different species of Grapta and Nisoniades, as recently distinguished in the Transactions of the American Entomological Society and the Proceedings of the Boston Society of Natural History, will confer a special favor, by communicating them; many of those already received have lost much of their value from the confusion of the species. Due credit will be given in every instance.

Letters, memoranda and specimens, sent to my address at the *Society of Natural History, Berkeley Street, Boston,* before March 4th, 1871, will be forwarded thence to me in season for incorporation in my book. The manuscript will soon be completed. It will form an imperial octavo of from four to five hundred pages, and be illustrated by chromolithographic plates in a style which, judging from specimens prepared, has never yet been equalled, even in Europe. — SAMUEL H. SCUDDER.

CALLIDRYAS EUBULE Linn.—This large Pierian butterfly was taken by me at New Bedford, Mass., Aug., 31st. Mr. Sanborn, who has seen the specimen, speaks of it as the first one of the kind observed in New England, or at least in Massachusetts. H. W. PARKER.

[Mr. S. I. Smith informs us that he has taken this insect abundantly at Fire Island, Long Island, N. Y., during the past summer.] — EDS.

MEPHITIS BICOLOR. — Since my note in the August NATURALIST was written, on the occurrence of this species in Iowa, I have obtained another skin in Grinnell, Iowa, and still another in Des Moines, from a dealer in pelts, who informs me that he bought at least fifty skins of the kind last winter, procured in that vicinity. There is reason to believe that the species may be found even in central New York. Dr. S. J. Parker, of Ithaca, N. Y., has twice seen by the roadside, in that region, a small, many-striped skunk, very different from the common one.—H. W. PARKER.

WOODCOCK AND MOLES. — The Shrew Mole (*Scalops Canadensis*) has been somewhat abundant for a few years past in Essex county, Massachusetts. These animals are found in low moist lands, though not unfrequently in highly cultivated gardens. The shrew mole is seldom seen above ground, but burrows with celerity below its surface.

The Star-nosed Mole frequents the same moist places, where, like the shrew mole, it finds its favorite food, such as earth-worms, grubs, etc. In procuring its food it makes extensive and numerous burrows, above which mounds of loose dirt are thrown to the surface of the land, which destroy the smooth and even surface of the meadow and make it look unsightly and difficult to cultivate.

Now there is a beautiful bird designed by nature to prevent the increase of these noxious animals from becoming excessive in places frequented by the mole. It is the woodcock (*Scolopax minor*), whose death is delayed until the 15th of August by a law of the State, after which time there will probably be a general attack made upon them with the gun.

It is observable what a difference there is in the appearance, in some localities, occupied by the above mentioned animals. A friend told me a few days since that it was difficult to mow a piece of his land last year on account of the many piles of earth thrown up by the moles. This year the surface of his land is smooth, and I have passed several times this summer by the place and have frequently heard, or flushed the woodcock feeding there in the dusk of evening. — AUGUSTUS FOWLER, *Danvers, August* 14, 1870.

TURKEY BUZZARD. — On page 375, current volume, J. L. B., in a paragraph on this bird, inquires "Can a Turkey Buzzard be deceived by his sense of smell? Did the Buzzard mistake the skunks' smell for putrefaction?" Two propositions are here answered as undeniable. First, that the Turkey Buzzard selects its food by the sense of smell; and second, that it prefers putrefied food. It seems to me that the exhaustive experiments by Mr. Audubon and Dr. Bachman, made nearly forty years since, as related by the former in his "Ornithological Biography," Vol. ii, page 33, should settle these questions. I think, then, that it may be safely assumed that both the Turkey Buzzard (*Cathartes aura*) and the Black Vulture (*Cathartes Jova*) are practically incapable of distinguishing odors, and select their food by the sense of sight alone; and also that they feed upon fresh, as readily as upon putrid, flesh. As the old error on this subject seems to be perpetuated no doubt to a considerable extent, and as that great work is rare, at least in private libraries, might not the whole, or at least a part of the paper to which I have referred, prove interesting to your readers? — J. D. CATON, *Ottawa, Illinois, Aug.* 22, 1870.

SPIKE HORNED BUCKS. — Mr. H. H. Bromley, proprietor of the Chasm House near Keeseville, has given me an account of the *spike horns* that is confirmatory of "Adirondack's" statements, and also shows that the variety extends farther south in the Adirondack region than heretofore stated.

Mr. Bromley was for six years the landlord of the Hotel at Franklin Falls, located on the Saranac River, about thirty miles southeast of Lewis Lake and the region mentioned by "Adirondack." When he first went into this region, eight years ago, he was told about the spike horned bucks which were then *common* and well known to all the hunters and trappers in the Saranac region. During his residence at Franklin Falls, he shot several spike horns, and one at least was a large buck of *four years* if not of five, and was so considered by several old hunters. In this specimen one of the horns was slightly forked at the end, but the other was a simple slightly curved spike. Mr. Bromley says that any old hunter of the Saranac region would laugh at the idea of all the spike horns being young bucks of two or three years, and he states that they can be recognized by their *shorter legs*, as well as by their spike horns.

Mr. Bromley thinks that the spike horns have increased in numbers over the branched horns, and that in spite of the extensive hunting are about as abundant as when he first went into the woods. — F. W. P.

DEER'S HORNS. — It is a well known fact that the horns of deer are but very seldom found in the woods, even in districts where the deer are very plenty. Several ways of accounting for their disappearance have been suggested, but the cause that seems to be the best substantiated is that of their being eaten by the various species of rodents seeking their food under the snow in early spring. In confirmation of this theory Mr. H. H. Bromley of Keeseville, N. Y., has informed me that he once found a deer's horn in the woods that had been partly gnawed, and had been nearly eaten through in two places by mice. — F. W. P.

SINGULAR MANNERS AND CUSTOMS OF THE HORNBILLS DURING THE BREEDING SEASON. — No sooner has the hen commenced the labor of incubation, say several trustworthy observers on this subject, than the male walls up the hole in the hollow tree in which the hen is sitting on her eggs, until there is only room for the point of her bill to protrude, so that until her young birds are hatched she remains confined to her nest, and is in the meantime assiduously fed by her mate, who devotes himself entirely to this object. This habit has been testified to not only by Tickell, Layard, and other Indian naturalists concerning some of the Asiatic species, but is also spoken of by Dr. Livingstone in the case of hornbills met with during his African explorations, and there appears to be no doubt of its authenticity. In Sumatra, in 1862, Mr. Wallace heard the same story from his hunters, and was taken to see a nest of the concave-casqued hornbill, in which, after the male bird had been shot while in the act of feeding its mate, the female was discovered walled up. "With great difficulty," Mr. Wallace tells us, "I persuaded some natives to climb up the tree, and bring me the bird. This they did, alive, and along with it a young one, apparently not many days old, and a most remarkable object. It was about the size of a half-grown duckling, but so flabby and semi-transparent as to resemble a bladder of jelly, furnished with head, legs, and rudimentary wings, but with not a sign of a feather, except a few lines of points indicating where they would come." — *Nature.*

GEOLOGY.

THE MEGATHERIUM AND ITS ALLIES. — The law of adherence to type, or pattern, in the skeletons of the Megatherium, Megalonyx and Mylodon, extinct animals of the sloth tribe, appears to be illustrated in a remarkable manner in the following particulars: —